



First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 750. (No. 19, Vol. XV.)

MAY 10, 1923

[Weekly, Price 6d.  
Post free, 7d.]

## Flight

*The Aircraft Engineer and Airships*

**Editorial Offices:** 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2  
**Telegrams:** Truditur, Westcent, London. **Telephone:** Gerrard 1828  
**Annual Subscription Rates, Post Free:**  
 United Kingdom ... 30s. 4d. **Abr** ... 33s. 0d.\*  
 These rates are subject to any alteration found necessary under abnormal  
 conditions and to increases in postage rates

\* European subscriptions must be remitted in British currency

## CONTENTS

	PAGE
Editorial Comment	
Our Very Frank Air Minister .....	247
Central Engines .....	248
From Blériot to Barbot .....	248
Across America .....	248
Parnall "Possum" .....	249
Coupe Beaumont .....	250
Air Force Expansion .....	251
Light 'Plane and Glider Notes .....	252
The "Turkey Buzzard" Glider .....	253
London Terminal Aerodrome .....	254
London-Continental Services .....	254
An Optical Altitude Indicator for Night Landing. By J. A. C. Warner .....	255
Notices to Airmen .....	256
Personals .....	256
Royal Air Force .....	257
R.A.F. Intelligence .....	257
In Parliament .....	257
Society of Model Aeronautical Engineers .....	258
Power Plants for Model Aeroplanes. By A. F. Houlberg. (Continued) .....	258

## DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

May 11 .... Lecture, "Low Power Flying," by Maj. M. E. A. Wright, before I.Ae.E.  
 May 31 .... Wilbur Wright Lecture, "The Relation between Aeronautical Research and Aircraft Design," by Dr. Joseph Ames, before R.Ae.Soc.  
 June 23 .... Grosvenor Challenge Cup, Lympne  
 June 25-30 International Air Congress, London  
 June 30 .... R.A.F. Aerial Pageant, Hendon  
 July 20-21 Air Race for King's Cup  
 July 16 .... Unveiling of R.A.F. Memorial by H.R.H. The Prince of Wales  
 July 20 .... Gothenburg Exhibition  
 Aug. 1 .... Entries close from British Competitors for Schneider Cup  
 Aug. 3-14 Rhön Gliding Competition  
 Aug. 6 .... Aerial Derby  
 Aug. 6-27 French Gliding Competition, near Cherbourg  
 Aug. 8-12 F.I.A. Conference, Gothenburg.  
 Sept. .... Light 'Plane and Glider Competitions  
 Sept. 23 Gordon Bennett Balloon Race, Belgium  
 Sept. 28 .... Schneider Cup Seaplane Race at Cowes  
 Oct. 14 .... Beaumont Cup Race at Istres, France

## EDITORIAL COMMENT.



PEAKING at the Constitutional Club on May 1, Sir Samuel Hoare, Secretary of State for Air, once more earned the gratitude of those concerned with aviation, and all who have the safety of the country and the Empire at heart, by making the perfectly frank, though somewhat unprecedented, admission that, "judged by every standard of defence, our Air Force at present is not strong enough." Coming from a Minister of the Crown (although, unfortunately, not as yet a member of the Cabinet), such a frank admission could scarcely fail to cause a certain amount of consternation, and the natural retort that could be made to such a statement is the question, Why has not his Government made it stronger? Sir Samuel, in introducing the Air Estimates, told the country some very plain truths, and did not hesitate, in order to bring home to the public the urgency of the position, to compare our strength with that of France, at the same time pointing out that a mere comparison of figures did not give a true picture of the situation. The result was that the country at large began to take notice, and already a much greater appreciation of the position is beginning to make itself felt.

By again emphasising that we are too weak in the air, Sir Samuel may have acted somewhat unconventionally, but he has, we are sure, done a very real service to the nation. As to why the Government has not taken steps to make us stronger in the air, Sir Samuel has a reasonably good answer in the fact that the whole problem of defence is being discussed by the Committee of Imperial Defence, and that until the results of their deliberations are available little further can be done. In the meantime, Sir Samuel's frank remarks will not fail to awaken the nation to a realisation of the vital importance of the problem, and there is more than a modicum of truth in the statement of Admiral Mark Kerr at the Air Conference that the only way to get anything done is by scaring the people until they force the Government to take the necessary steps to remedy our shortcomings in the air.

**Central  
Engines** For several years it has been evident that there is the possibility of very considerable advantages in developing

aircraft in which the power plant is situated centrally in the fuselage, where it can be more or less under constant supervision of the crew, thus affording a possibility of effecting minor adjustments or even repairs during flight. Apart from this advantage, which is most pronounced in aircraft equipped with more than one engine, it is useful, in certain types of military aircraft, to get the propeller away from the nose of the fuselage so as to get the view and gun position afforded by the machine with engines on the wings. A certain amount of gain may also possibly be obtained by getting the fuselage out of the slip-stream, although this problem is rather complicated by the effect which the inter-action of propellers and fuselages is known to have upon propeller efficiency. The whole problem is complicated, and no amount of theoretical speculation can settle it. It is therefore gratifying to be able to announce that this country is not lagging behind, but that work in this direction is proceeding. Elsewhere in this issue we give a brief description of the Parnall "Possum," and, as the daily press has suddenly discovered the fact, there can be no harm in mentioning that an all-metal machine with two Napier "Lion" engines is nearing completion at the Norwich works of Messrs. Boulton and Paul's. This machine, which may be said to be a development of the "Bolton" (described in our issue of October 5, 1922), at any rate, as regards the all-metal structure, has central engine housing and transmission drive to four propellers on the wings. From the fact that two such modern ideas in design as all-metal construction and central engine housing are combined in the one machine it will be understood that it is pretty well the last word in aircraft design.

**From  
Blériot  
to Barbot** The double crossing of the Channel on Sunday last was a very fine sporting performance, and M. Barbot is to be congratulated upon being the first aviator of recent years to cross in a machine fitted with an engine of low power. In many ways the flights were reminiscent of Blériot's famous flight in 1909, and it is not, therefore, without interest to compare the two, and to attempt to draw from the comparison certain conclusions which appear capable of serving as a measure of the progress made in the intervening years. To begin with, Blériot's first cross-Channel flight was not by any means the best flight he had made up to that time, but the very fact that the flight was made over water from France to England impressed the public as no other could have done. In fact, general interest in aviation may be said to have begun from that date.



#### Royal Air Force Pageant

THE Fourth Royal Air Force Pageant, which was instituted in 1920, will take place on Saturday, June 30, at the London Aerodrome, Hendon, by arrangement with the Grahame-White Company. It is hoped that H.M. the King, Chief of the Royal Air Force, will be present. This annual review of the flying units is an integral and important part of the annual training of the Royal Air Force. A programme has been arranged which will fully equal in interest that submitted in previous years, special attention being devoted to the presentation of demonstrations of the most scientific methods in aerial attack and defence, and to a display of aircraft of the latest types for co-operation with the Navy and the Army and for independent Air Force activities. As

From a technical point of view, Barbot's flights on Sunday were not by any means the best this famous pilot has made, but, as in 1909, the feat caught in a wonderful way the public imagination, in spite of the confusion inevitable caused by applying the terms "glider" and "gliding" to the machine and flights. As a matter of fact, the machine was not, of course, a glider, nor were the flights in any way in the nature of gliding flights, the engine being kept running the whole time. However, that is merely by the way. What matters is that the whole of France and England, and possibly most of the civilised world, at once became interested, and the result may very well be—we think it will be—that just as Blériot's flight in 1909 marked the beginning of practical aviation, so Barbot's flight marks the beginning of sporting flying, using the term in the sense of flying, which provides excellent sport at a price within reach of the many, and not, as hitherto, confined to a few wealthy enthusiasts.

As regards the flight itself, Barbot's machine was fitted with an engine capable of delivering about 16 h.p., and consequently the machine ought to fly rather well with an engine of that power. Do not let us forget that Blériot's famous flight was made with an engine of only 28 h.p., and one far less efficient and reliable than the present engine. It is nevertheless certain Barbot has done a great deal of very useful propaganda by his flights, and for that he deserves the thanks of all interested in aviation, as does also M. Dewoitine, the designer of the machine.

\* \* \*

**Across  
America**

Once more American aviators have focussed the eyes of the world on flight progress in the U.S.A. This time the record took the form of a non-stop flight across America, from New York to San Diego. Using the same Fokker F IV monoplane, with 400 h.p. Liberty engine, on which they recently established a world's duration record by flying for 36 hours, Lieutenants Macready and Oakley Kelly left Roosevelt Field outside New York at 1.38 p.m. on May 2, landing at San Diego at 4.27 p.m. on May 3, having covered a distance of about 3,000 miles in under 27 hours. Dayton, Ohio, was passed in the afternoon, and the aviators dropped a note saying that they were all right and were averaging 92 miles per hour. Atchinson, Kansas, was passed at 11.5 p.m. on Wednesday night, and Wickensburg, Arizona, at 10.30 a.m. on Thursday.

Considering that the flight included one whole night's flying, and the crossing of the Rocky Mountains, it was a wonderful performance, and one at which not only the aviators themselves, but the whole American nation may well be elated. Congratulations to everyone concerned.



in the case of the Royal Tournament, all the proceeds are devoted to Service charities.

**The King's Cup, 1923**

His MAJESTY THE KING has again presented to the Royal Aero Club a Cup for an air race during the present year.

His Majesty has approved the conditions, which are similar to those of the Circuit of Britain Air Race last year.

The aeroplane and engine must have been constructed in the British Empire, and the pilots must be British subjects. The race, which will be on handicap, will extend over two days, viz., Friday and Saturday, July 20 and 21, starting and finishing at the London Aerodrome, Hendon. The following towns are included in the circuit: Birmingham, Newcastle, Glasgow, Manchester, Bristol.

# THE PARNALL "POSSUM" TRIPLANE

450 H.P. Napier "Lion" Engine

ALREADY during the War the Germans experimented with aeroplanes having a central engine housing with transmission to propellers on the wings. In one instance, the Linke-Hoffmann, the engines drove a large-diameter air-screw placed, as in single-engined machines, in the nose of the fuselage. In France the Breguet firm has produced the Breguet-Bugatti engine unit, in which two engines drive a common propeller-shaft with a single air-screw in the nose of the fuselage.

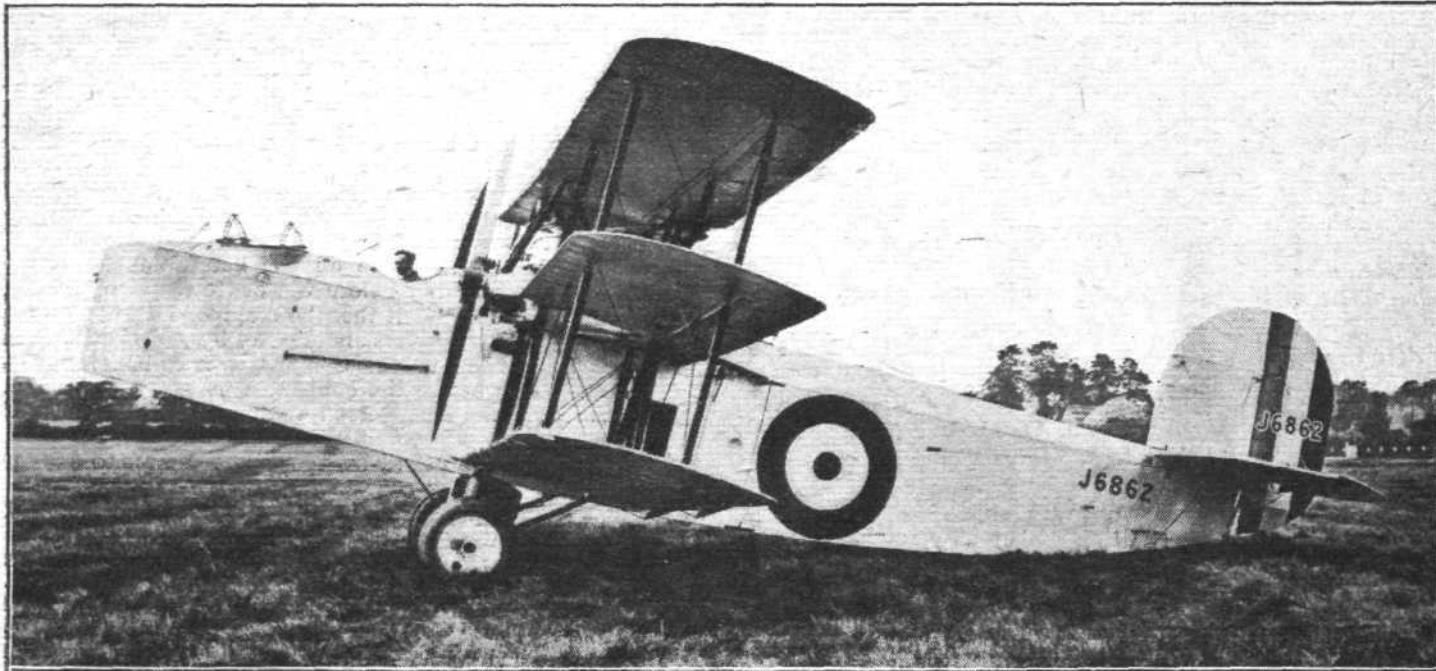
In this country we were somewhat late in starting experiments with central engine housings, but work has been going on for more than a year now on various machines in which the central placing of the engine is the main feature. The difficulties are very considerable, not only because the central placing of all the heavy weights results in greater wing stresses, but also, and more particularly, because the design of a sufficiently rigid transmission offers very serious problems.

The Parnall "Puffin," designed by Mr. Bolas and constructed by George Parnall and Co. of Bristol, is essentially an experiment intended to test the merits of central engine unit with transmission gears to propellers on the wings. Ultimately, of course, the goal is the production of large

Accommodation is provided for a crew of three. The pilot's cockpit is a short distance ahead of the air-screws, and he consequently obtains an excellent view forward and downward, with the added advantage that there is no slipstream to cause swirls in and around his cockpit. In front of the pilot is placed a compartment for a wireless operator, navigator or gunner, whichever is carried, and a set of dual controls is installed so as to allow either pilot or gunner to take control of the machine on a long flight or in emergency.

The engine, as already stated, is housed inside the fuselage, in line with the wings, and behind it is a compartment for the engineer. The latter is provided with a starting handle by means of which he can start the engine without leaving his cockpit, so that the machine can get away from an aerodrome or field without assistance from anyone outside the crew. Radiators are fitted on the sides of the fuselage, and are so mounted that the cooling can be varied by swinging back the radiators, maximum cooling being obtained when they are at right angles to the fuselage and minimum cooling when they lie against the sides of it.

The undercarriage is of the combined oleo and compression rubber type, and special attention has been paid to handling



**THE PARNALL "POSSUM" :** This machine, which is fitted with a Napier "Lion" engine, has a central engine housing and propellers placed on the wings.

machines with two or more engines in the fuselage, driving two or four propellers on the wings, but at present the constructors of the "Puffin" have confined themselves to the use of one engine, a Napier "Lion," so as to experiment with various forms of transmission, and at the same time obtain an idea of to how great extent it is possible for the engineer to look after his engine, even to the extent of effecting minor adjustments or repairs during flight. Many of the experiments carried out up to the present have indicated that the transmission is likely to be unduly heavy, but there is reason to believe that as more experience is gained it will be possible to bring down the weight to a reasonable figure. In the case of the Parnall "Possum" we understand that the central placing of the engine and the outboard position of the propellers, with transmission gearing, etc., has increased the weight by something like 1 lb. per horsepower, but it may be possible ultimately to reduce this weight somewhat, and experience may show that the advantages attained outweigh the increase in structure weight.

In the Parnall "Possum" the triplane form of wing structure was chosen so as to enable the shafts of the transmission to be housed inside the middle wing. The form of wing bracing adopted makes the mounting for the gear-boxes very rigid, and no undue vibration is, we learn, experienced when the engine is running. Universal joints are incorporated so as to allow of a certain amount of relative movement without throwing undue stress on to the shafts.

and steering the machine on the ground. For this purpose the usual tail skid has been replaced by a steerable tail wheel of novel design. The tail wheel is fitted with brakes in such a way that the weight on the wheel actuates the brakes. Thus the braking force is always proportional to the load on the wheel, and it is claimed that when properly adjusted no skidding of the wheel can take place. The brakes are connected up to a lever in the pilot's cockpit so as to enable him to release the brakes for taking off and taxiing. This tail wheel has already proved to be of very great advantage when handling the machine on the ground. Not only is the use of a special tail trolley avoided, but even at walking pace the machine can be steered almost as easily as a motor-car.

Both the engine and transmission have been severely tested on the test bench and in position on the machine, the whole unit having been run for nine hours in the machine on the ground at 90 per cent. of full power.

Following are the main particulars of the Parnall "Possum": Length o.a., 39 ft. ; span, 46 ft. ; chord, 6 ft. ; gap, 4 ft. 6 ins. ; wing area, 777 sq. ft. ; incidence, 3 degrees ; dihedral, 2½ degrees ; propellers, spaced 14 ft. 6 ins. apart ; diameter, 9 ft. 6 ins. ; propeller, r.p.m., 1,180 ; weight of machine loaded, 6,300 lbs. ; wing loading, 8.1 lbs./sq. ft. ; power loading (on 450 h.p.), 14 lbs./h.p. As the machine has been built for the Air Ministry no performance figures may be published.

# COUPE COMMODORE LOUIS D. BEAUMONT

(Under the Regulations of the Fédération Aéronautique Internationale and the Commission Sportive of the Aero Club de France)

## GENERAL REGULATIONS

### Origin of the Cup

Art. 1.—Commodore Louis D. Beaumont, of the United States, offers a sum of 200,000 francs for an international speed contest to be called the Coupe Commodore Louis D. Beaumont.

The Cup will be contested under the conditions of the present Regulations, which have been drawn up at the request and with the approval of the donor by the Commission d'Aviation of the Aero Club de France.

The Commission d'Aviation is responsible for the organisation of the contest.

### Qualification of Competitors and Pilots

Art. 2.—Every qualified National Federation shall intimate to the Aero Club de France its willingness to compete for the Cup. This intimation must reach the Secretary of the Commission d'Aviation, 35, Rue François 1er, Paris, by the date fixed by the Special Regulations for the year.

The entry must be accompanied by a sum of 5,000 francs for each machine, 3,000 francs of which will be returned if the machine crosses the starting line in flight.

The competitors entering for each nation shall be the constructors of the machines. They shall not be approved unless presented by a National Federation affiliated to the Fédération Aéronautique Internationale.

Each National Federation may only present as competitors and pilots persons of its own nationality or of a country not represented on the F.A.I., with the exception of countries at war with France from 1914 to 1918, unless they are members of the League of Nations.

### General Conditions

Art. 3.—The contest shall be an international challenge open to machines Class C (aeroplane with engine).

There shall be two competitions, each a speed contest over a distance of approximately 300 kms.

The Cup shall be contested in France, the date and place being fixed by the Special Regulations for the year.

### Prizes

Art. 4.—The sum of 200,000 francs shall be distributed as follows:—

(a) Two *objets d'art* of the value of 25,000 francs each, which shall be deposited with the Aero Club de France until awarded.

(b) Two prizes of 75,000 francs each.

### First Competition

Art. 5.—The first competition shall take place in 1923.

The winner shall receive a prize of 75,000 francs.

If, for a reason approved by the Commission d'Aviation of the Aero Club de France, the competition does not take place, it shall be postponed from year to year.

If the competition takes place and the prize of 75,000 francs is not won, it shall be added to that for the second competition.

### Second Competition

Art. 6.—The second competition shall take place in the year following that in which the first competition was held.

The winner shall receive a prize of 75,000 francs.

If, for a reason approved by the Commission d'Aviation of the Aero Club de France, the competition does not take place, it shall be postponed from year to year.

If the competition takes place and the prize is not won,



### Flying School for Prague

A SCHOOL of aviation is to be established shortly at Prague by the Czecho-Slovakian Ministry of Public Works. This school is intended for training pilots for State service, but we are not certain whether or not civilian pilots will also be trained here.

### A Royal Pilot

FROM Brussels it is reported that His Majesty King Albert of Belgium recently tried his hand at piloting. It is, of course, well known that the King of the Belgians has long given very practical support to aviation by owning and using very frequently his own aeroplanes. Hitherto, however, His Majesty has been content to be a passenger. On May 2, however, while making a flight in one of the new Belgian built and designed school machines, King Albert decided to try to pilot the machine. As it was fitted with dual controls this was not a difficult experiment, and His

the Cup and prize shall be awarded to the winner of the first competition.

In the event of neither of the competitions being won the Aero Club de France shall publish new Regulations in agreement with the donor.

### Awards of Objets d'Art

Art. 7.—The two *objets d'art* shall be awarded one to the constructor and one to the pilot of the machine which has attained the greatest speed in either of the competitions.

Art. 8.—The competitors entering are responsible for all accidents to themselves and their personnel, as well as for damage of any kind to third parties, officials, etc., caused by their machines, pilots, workmen or themselves.

Art. 9.—In accordance with administrative and customs requirements, competitors shall send to the Commission d'Aviation of the Aero Club de France, on a date fixed by the Regulations for the year, the following information, under penalty of being prevented from taking part in the contest:—

(1) Value of the machine; (2) name and address of the pilot of the machine, also name and address of substitute; (3) name and number of the machine; (4) type of machine and engine; (5) weight and material of wings; (6) weight of engine; (7) weight of propellers; (8) country of origin.

### SUPPLEMENTARY REGULATIONS FOR 1923

Art. 1.—The contest will take place over 300 kms. with a circuit of 50 kms., the starting and finishing line being on Istres Aerodrome (Bouches-du-Rhône).

Landings, repairs and replenishments are allowed.

Art. 2.—The contest will take place on October 14, 1923.

Art. 3.—Entries presented by the National Federations must reach the Commission d'Aviation of the Aero Club de France before 6 p.m. on August 1.

Art. 4.—Competitors must send to the Secretary of the Commission d'Aviation before 6 p.m. on August 1 the information required in Art. 9 of the General Regulations.

Art. 5.—Machines must be on the aerodrome at Istres before 4 p.m. on the day before the contest.

The principal 'planes will then be stamped.

Art. 6.—Each entrant must nominate, by a declaration in writing to be handed to the Commissaires Sportifs before 6 p.m. on the day before the contest, a person to represent him on the course. This person shall declare the time of departure.

Art. 7.—The contest shall be open from 8 a.m. to 5 p.m. (winter time).

During this period of nine hours, starts shall be made at times selected by the competitors as follows:—

Each entrant, or the person accredited by him, shall inform the Commissaires Sportifs of his intention of starting, indicating the time at which he wishes to start. The Commissaires Sportifs shall then hand to him a slip fixing the starting time, after which 30 minutes shall be allowed to the competitor to cross the starting line in flight.

The competitor shall be allowed a second start in the event of his first flight not being completed or not being in order. This start shall be made under the same conditions as the first.

Art. 8.—The competition shall not be won if the speed attained is less than 290 kms. per hour.

Art. 9.—In the event of bad weather on the day of the contest, the Commissaires Sportifs may postpone the contest from time to time.



Majesty is stated to have flown the machine for a considerable period, without assistance from his pilot.

### The New Boulton and Paul Machine

ACCORDING to our usual custom of refraining from making any reference to new machines being built for the Air Ministry, we have not hitherto mentioned that work was going on at Norwich on a new all-metal aeroplane. Since, however, the daily press does not appear to have any such scruples, we may briefly record that the new machine is very much larger than the "Bolton" described in FLIGHT last year. Like that machine, however, the construction is entirely of metal, a form of construction in which Boulton and Paul's have specialised for several years. The design is, of course, due to Mr. J. D. North, chief engineer of the firm, and the machine is unusual in having a central engine housing for the two Napier "Lion" engines. Four propellers are placed between the wings, with a transmission gear of special design running from the engines to the propellers.

## AIR FORCE EXPANSION

### Sir Samuel Hoare's Speech at the Royal Academy Banquet

THE PRINCE OF WALES was the principal guest at the annual banquet at Burlington House of the Royal Academy of Arts on May 5. Sir Aston Webb, President of the Royal Academy, presided over a very distinguished company, and after proposing the loyal toasts, to which His Royal Highness replied, the president proposed "The Imperial Forces of the Crown." Mr. Amery, responding on behalf of the Navy, referred to the great curtailment that had recently taken place. He called attention to the change which had come about with the surrender of the German fleet, resulting in the necessity for considering concentration at a new centre on the middle seas. He also pointed out that the Navy of the Empire must depend upon support from all partners of the Empire, and not upon the Mother-country only.

Field-Marshal Sir William Robertson, who replied on behalf of the Army, pleaded for "a little more interest in Army matters in time of peace. Your ships may prevent you losing a war, but they will never win it for you."

Sir Samuel Hoare, Secretary of State for Air, in responding to the toast on behalf of the Royal Air Force, said:—

"I am grateful to the President and the members of the Royal Academy for including the Royal Air Force, the youngest and smallest of the three fighting Services, in this distinguished toast. Gentlemen, we are a very young Service. Flying has only been a serious enterprise for twenty years, military flying for ten, and the Royal Air Force itself has only existed for five years, but I think that we may safely affirm that if during so short a period there has been so conspicuous a development in aviation, the next twenty years will see progress that at present we can scarcely imagine. Is it not significant of the development of the air that one of the most beautiful and arresting pictures in this year's Academy should be a view of the Port of London painted from the air?"

"Gentlemen, being a young Service, encompassed with many difficulties, we have our full share of problems to solve in the immediate future. What, for instance, should be the standard for our air defence? How is the Force itself best to be organised?

"These, observe, are new questions to which politicians and the public have hitherto given scant attention. The Air Force was improvised for the War, and splendidly it



### Royal Tournament

THE Royal Tournament, which opens on Empire Day, will mark the 45th year since it was first held. It was in 1878 that the germ of the idea formed, when a tourney was arranged to entertain the Volunteers engaged in shooting at the Wimbledon Meeting. Two years later it became a separate institution, housed at the Royal Agricultural Hall. The first profit made for the charities was one of £500, and in the course of years this grew into thousands. The most prosperous years have been from 1914 onward, when all records were broken. Six million people have attended and paid over a million sterling for admission, out of which one quarter has been profit, and the charities have benefited accordingly.

This year considerable variety will be introduced into the programme, including an airship fight, in the guise of a night aerial demonstration by Air Defence Brigades, this forming a sensational finale to each performance.

The box offices are now open at 66, Victoria Street, and at Olympia.

### Parcels by Air to Paris and Holland

THE Postmaster-General announces that parcels for conveyance by aeroplane to Paris and Holland, which could hitherto be posted only at a few Post Offices in London and in the larger provincial towns, will in future be accepted at every Branch Post Office in London and at every Head Post Office in the provinces. A new and cheaper parcel service to Paris, for parcels of a less urgent kind, has also been instituted, and will be known as the "Non-Express" Air Parcel Post—the present service being known as the "Express." The fees will be as follows:—

Up to 2 lbs. 2-5 lbs. 5-8 lbs. 8-11 lbs.

	s. d.	s. d.	s. d.	s. d.
--	-------	-------	-------	-------

Express Service	..	1	9	3	0	4	6	6	0
Non-express Service	..	1	6	2	3	3	3	4	3

The air parcel post to Holland similarly offers a substantial saving in time of transmission of urgent parcels to that country. The fees payable are as follows: On parcels

acquitted itself. Its place in home defence and its peace-time organisation are questions which have never been settled—indeed until the last few weeks they have scarcely ever been discussed. It is to these two questions that I am constantly addressing myself, and it is to these two questions that I would ask the attention of the representative assembly that is gathered here tonight. I should trespass upon your patience if I attempted to elaborate answers to them, and if I do not trespass upon your attention it would be unprofitable for me to give a useful reply until the Committee of Imperial Defence has finished its enquiry into them.

"Permit me, however, to make one single observation, and I believe that it is an observation of the first importance.

"If an expansion of the Air Force is to take place—and I believe that when the facts are fully weighed an expansion of the Royal Air Force is bound to take place—there is one condition that must be fulfilled. The expansion must be so organised as to make aviation and air defence an integral part of the life of the nation. Home defence on land ceased to be the exclusive province of a profession when, first by the volunteers and secondly by the Territorials, mainly due to the efforts of Lord Haldane, it entered into the life of the civilian population. Whilst there are obvious difficulties in the way of a similar development of the air defence, I none the less say, and I say quite definitely, that though the brunt of home defence will always fall upon the highly-trained regular squadrons, a definite place should be found for the growing number of men of every class, sportsmen and scientists, engineers and artisans, who year by year are taking a keener interest in aviation. Only in this way will the air sense of the nation, supported as I hope by the expansion of civil aviation, become as deep and general as the sea sense of the nation. Only in this way can we develop to the full our home defence against air attack, on the one sound principle upon which we have not only organised our home defence in the past, but upon which we made it possible for the nation to win the War—namely, that civilian and territorial have their definite place to play in it. In this way there will come about a real National Air Force, deeply embedded in the national life, fully capable of undertaking the Imperial duties to be placed upon it, and no less capable of carrying out the even more important duty of the defence of these shores against air attack."



weighing up to 3 lbs., 3s. 6d.; 3-7 lbs., 6s. 6d.; 7-11 lbs., 9s. These fees include express delivery at the place of destination. On a parcel addressed "Poste Restante" the charge is 6d. less.

### Cobham's Great Hustle

THAT amazing pilot, Alan Cobham, has just added another exploit to his long list of successes. A few days ago he returned from a 12,000 miles' air tour over three continents, and on Monday and Tuesday of this week he flew from Rome to London with photographs for the *Daily Mail* of the visit of the King and Queen to Rome. Leaving Rome at 6 p.m. on Monday, Cobham reached Pisa at 8 p.m., having taken two hours to do the 175 miles against a strong headwind. After a few hours' sleep in a hangar Cobham started out from Pisa at 4 a.m. on Tuesday morning and reached Lyons at 8.30 a.m., where he replenished. After an hour's stay at Lyons he headed towards le Bourget, where, without alighting he dropped photographs for the *Continental Daily Mail*, and then made for Croydon, which was reached at 2.30 p.m.

The machine used was one of the famous D.H.9's of the de Havilland Hire Service, and is equipped with a Siddeley "Puma" engine of 240 h.p., made by Armstrong-Siddeley Motors, Ltd., of Coventry, in 1918, and which has been in continuous use ever since. Cobham's 12,000 miles' tour was covered in 130 hours' flying time, during which no overhauls were found necessary.

### Helicopteritis

DURING the last few days there has been a perfect epidemic of flights with helicopters. M. Etienne Oemichen has established a "duration record" by remaining clear of the ground for five minutes, and later another "record" by flying in a closed circuit of small diameter. M. Pescara also made a short circular flight, getting out of a circular space about 30 ft. in diameter. In America the de Bothezat helicopter is stated to have left the ground with four persons on board, which is probably a record for weight lifting.

# LIGHT 'PLANE AND GLIDER NOTES

ANOTHER milestone in the progress of aviation was established on Sunday, May 6, when M. Georges Barbot made the flight across the Channel and back on his little Dewoitine monoplane. One thing has marred the very fine performance of Barbot—*i.e.*, the manner in which the daily press proclaimed from the house-tops that the Frenchman had "glided" across the Channel. When it was first announced that the *Daily Mail* had offered a prize of £1,000 for light 'planes, we protested against the use of the word "motor glider," pointing out that the word is an absurdity, and that light aeroplane or light 'plane is the logical term to use. Already our opinions have been confirmed by the way in which Barbot's flight was heralded as a "glide." The term motor glider having been accepted and given official sanction by the Royal Aero Club, the daily press naturally took it up, and in the hustle of daily journalism the "motor" dropped out, with the result that the Press, almost without exception, spoke of the flights as having been glides. Most of the minor fry can be excused, but it is surprising to find the *Morning Post* amongst the offenders. Thus in the mind of the public there has been caused a great deal of confusion, and nobody seems to be quite certain whether Barbot glided across or flew across.

\* \* \*

WE are extremely glad to note that *The Times*, taking its usual calm and well-considered view of things, points out that although Barbot's flight was a notable event in the history of aviation, "in estimating its true importance the first essential is to get rid of the idea that it was in any sense an experiment in the art of gliding."

\* \* \*

To return to the flight itself, M. Barbot had intended to make the attempt on Saturday, May 5, but after rising to a considerable height he cruised about for two hours without being able to locate the two seaplanes that were to have acted as his escorts. Thinking that they had been unable to find him, and seeing that there was a heat mist over the Channel, he wisely decided to abandon the attempt.

\* \* \*

ON Sunday, May 6, the weather was favourable, although there was a good deal of mist about, and it was not until towards evening that Barbot decided to make the attempt. Spending about half an hour in reaching a height of 5,500 ft., so as to be able to make a good long glide should his engine fail, he headed towards the English coast. Travelling over Folkestone and Hythe, he reached Lympne after having been in the air for one hour one minute.

\* \* \*

M. BARBOT brought with him a red ensign which it had been his intention to drop from his machine when over English soil. However, it got entangled in some part of the machine and he could not release it. After landing he handed it to members of the party which had assembled at Lympne, among whom was Lord Edward Grosvenor. The flag bore the message, "À la memoire des soldats Anglais tombés sur la terre de France 1914-1918, Dewoitine, Barbot."

\* \* \*

WHEN mechanics examined the Dewoitine it was found that one of the bracing wires of the undercarriage had been damaged, and it took some considerable time to get it

replaced, so much so that there was some anxiety as to whether Barbot would be able to get back to St. Inglevert before dark. However, the wire was ultimately replaced, and after further delay, owing to the engine refusing to start, he got away, and, as was learned afterwards, alighted safely at St. Inglevert, having made the double journey, and thus won the 25,000 francs prize offered by *Le Matin*.

\* \* \*

WITH regard to the machine itself, this is already familiar to readers of FLIGHT, a photograph of it having been published in our issue of April 12, 1923. For this particular flight the Anzani engine was replaced by a Clerget, on the grounds, it is stated, that the Anzani is not a French engine. This seems a curious decision, and one would have thought that Anzani was at least as much French as is M. Dewoitine.

\* \* \*

THE Clerget engine fitted in the Dewoitine is of the same type as that exhibited at one of the Paris Aero Shows some years ago, and it is rather interesting to recall that the same engine was, some years ago, fitted in the curious little de Pischoff biplane, on which the designer made several cross-country flights without anyone outside aviation circles taking much notice of his performance. De Pischoff was later killed while flying this little machine—due, it was thought, to the machine having met such strong "bumps" that de Pischoff was thrown out of the machine. The engine is of approximately the same capacity as the Bristol "Cherub," and would not, therefore, be accepted for the forthcoming competition for the Sutherland Prize. As used by Barbot the engine is thought to have developed about 12 h.p., although it is supposed to be capable of 16 to 18 h.p. when run all out.

\* \* \*

THE official times given by the Air Ministry for Barbot's flights are as follows:—Left St. Inglevert, 6.20 p.m.; arrived Lympne, 7.21 p.m.; left Lympne, 8.1 p.m.; arrived St. Inglevert, 8.45 p.m. The longer time taken on the outward journey is due to the fact that Barbot climbed to over 5,000 ft. before setting out across the Channel. On the return journey, with darkness coming on, he flew low without losing any time. The petrol consumption is stated to have been about 2 gals., and as the direct distance is approximately 36 miles, this represents his fuel consumption. As there was, however, no restriction on the amount of petrol consumed, Barbot probably did not trouble to reduce this to a minimum, and the machine furthermore had a light cross wind on both trips, which would somewhat lower the mileage per gallon.

\* \* \*

ON Monday last, May 7, Barbot flew the Dewoitine from St. Inglevert to Le Bourget, with an intermediate landing at Beauvais. Leaving St. Inglevert at midday, he landed at Beauvais at 2.30 p.m., having covered about 75 miles in 2½ hours against a head wind. Leaving Beauvais at 5.20 p.m., he landed at Le Bourget at 6.5 p.m. It is estimated that he had covered the distance of somewhat over 150 miles at a cost for petrol of about 10s., or less than a penny a mile. In a few days Barbot is stated to be leaving for America with his Dewoitine. Is he going to introduce it to Mr. Henry Ford for mass production?



## Mr. Handley Page and the Overseas League

LECTURING before members of the Overseas League on Monday, the 7th inst., Mr. F. Handley Page made a striking appeal on behalf of British commercial aviation. That he succeeded in impressing his audience by bringing home to them, in his usual inimitable and amusing style, the serious position in which British commercial aviation is likely to find itself unless strong action be taken was apparent by the enthusiasm accorded by all present.

His lecture, besides serving the purpose of providing this necessary "ginger," was especially interesting to those more or less out of touch with matters aviatic, as he briefly outlined what was being done in Europe with commercial air lines and gave several striking comparative figures. We do not propose, however, to report his lecture in full, as—apart from our being short of space—most of the information he gave us is already known to our readers. There were one or two points made, however, which we think might be recorded.

Referring to the nose dive made by British aerial supremacy since the War, he compared our present air line activities, and those of France, to the big transcontinental and transatlantic lines in the case of the latter and the S.E. and C.R. suburban lines in the case of Great Britain. He urged that the Air League should receive even a greater support from the people of Britain than that attained by the Navy League, for supremacy of the seas was useless without supremacy in the air. He pointed out that it was essential to cultivate an "air sense" in the people, so that the younger generation would realise the romance of air travel as today they do in the case of travel and adventure by sea.

In moving a vote of thanks to the lecturer, Lieut.-Col. Mervyn O'Gorman, who was in the chair, also made a strong appeal to every one to give their support to one or other of the three bodies at present in existence looking after the interests of aviation—*i.e.*, the Air League, the Royal Aeronautical Society and the Royal Aero Club.

# "FLIGHT" GLIDER DESIGNING COMPETITION\*

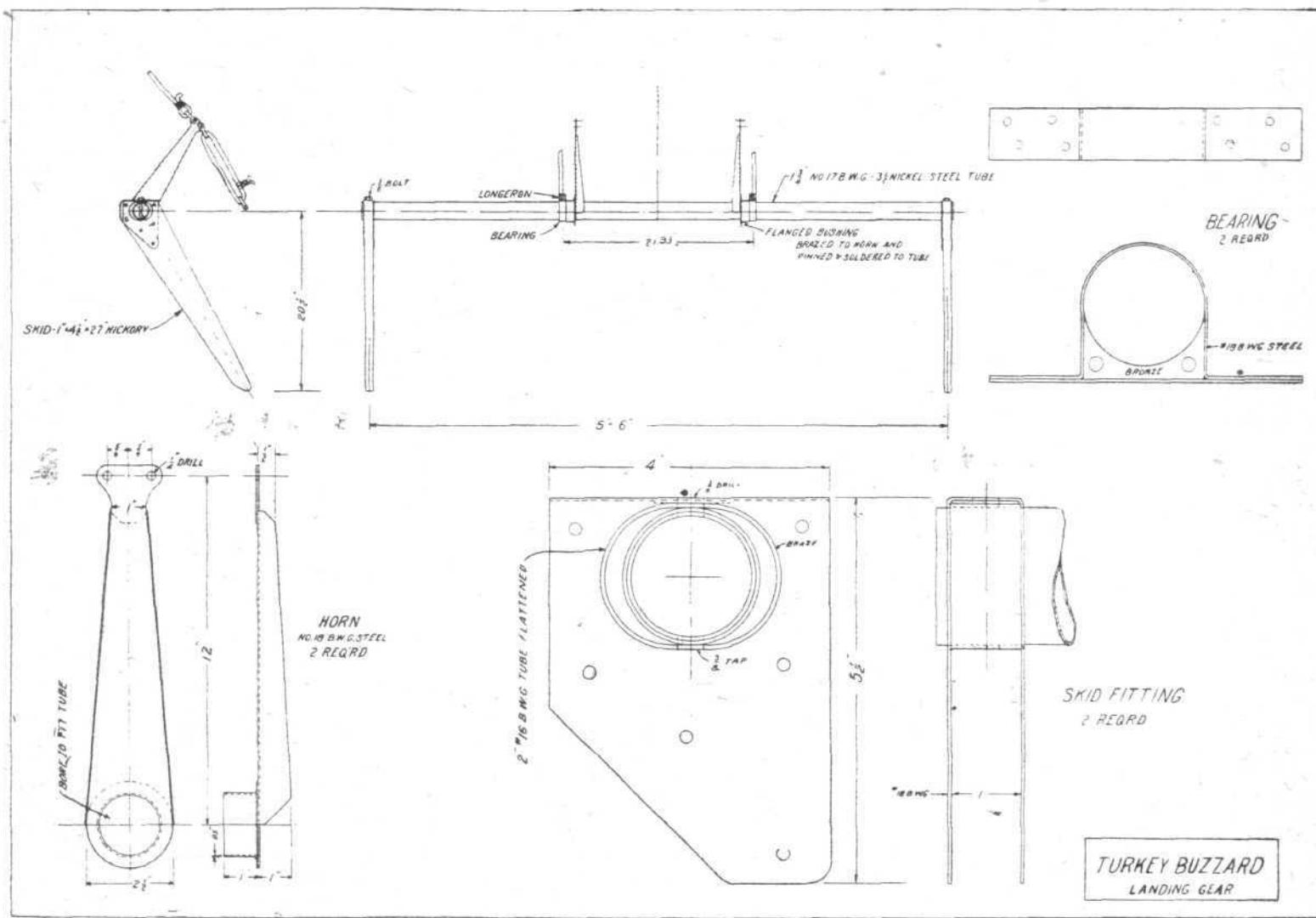
## "TURKEY BUZZARD"

THE last item in the construction of "Turkey Buzzard" is the undercarriage. It has already been mentioned that we do not particularly like the form adopted by the designers of "Turkey Buzzard," for various reasons. To begin with, practical experience at Itford last year showed that fitting "tail skids" on the main undercarriage tended to retard the launch to such an extent as to prevent the machine getting off. The glider built by the Aircraft Disposal Company was fitted, somewhat after the fashion of "Turkey Buzzard," with two tail skids of the type used on Bristol fighters. In attempting to start the machine these skids were found to dig into the ground to such an extent as to act as very effective brakes, and after one or two unsuccessful attempts to get the machine into the air, the skids were removed and two small wheels substituted, when starting took place without difficulty.

In the case of "Turkey Buzzard," with the wing placed as it is well above the fuselage, it is necessary to have a fairly wide "wheel" track in order to prevent the machine from

inside the fuselage turn with the tube and stretch the rubber shock absorbers.

Apart from the objection to the tail skids previously stated, the arrangement is open to criticism on account of the rather severe stresses that will be set up in the cross tube. These are partly bending and partly twisting stresses, and as the skids move upwards the lines of maximum stress shift around the tube. By employing a sufficiently large diameter and heavy-gauge tube it is, of course, possible to provide sufficient strength, but as the skids are undesirable in any case, we would suggest that a better arrangement might be to have two fixed transverse tubes running across the fuselage, with the wheel axle between them. Rubber shock absorbers at the outer ends would provide the springing, and two wheels complete the undercarriage. The weight and resistance should not be any greater, and the machine would certainly handle better on the ground. The only advantage of the skids would appear to be that on landing they would pull the machine up very quickly. Thus if a landing were made



"TURKEY BUZZARD":

Details of undercarriage.

turning on to a wing tip in landing. The manner in which the designers have attacked the problem is shown in the accompanying drawings. A steel tube runs across the bottom of the fuselage, resting in bearings on the lower longerons. At the outer ends of this tube are mounted hickory skids similar in shape to ordinary tail skids. Just inside the sides of the fuselage are two cranks, bolted to the cross tube. From the free ends of these cranks shock absorbers are taken to convenient points on the fuselage structure. Thus when the weight of the machine comes on the skids the transverse tube turns, owing to the fact that the free ends of the skids are behind the pivot, and the cranks

\* The general arrangement drawings of "Turkey Buzzard" were published in our issue of April 12, 1923; performance calculations, fuselage construction details, etc., on April 19; details of the wing construction on April 26; and wing fittings, elevator details, controls and tail skid on May 3.

on the side of a fairly steep hill it is conceivable that the skid chassis would enable the machine to "stick" to the hill, while a wheel undercarriage would probably result in the machine rolling down the side of the hill. On the other hand, the skids might pull up the machine too abruptly and tend to turn it on to its nose.

It must be largely a matter of personal preference which type of undercarriage is chosen, and certainly there is no harm in making the one designed and trying that first. If it does not answer it is not a difficult nor an expensive matter to change it for a wheel type. In fact, if we remember rightly, in the Aircraft Disposal Company's glider the skids themselves were provided with holes for attachment of wheels, so that the springing was carried out as before, but small wheels were mounted on the existing skids.

## London Terminal Aerodrome

Monday evening, May 7, 1923

THE rapid increase in passenger traffic which is now taking place on practically all the air routes is well illustrated by the figures of travellers carried by Handley Page Transport between London and Paris recently. In the month of April alone this one company carried 669 passengers between the two cities, as compared with 258 in April, 1922. In all 77 flights were made, making an average of only just under nine passengers per flight, or approximately 75 per cent. load. From May 1 to May 4 inclusive, in 16 flights, 128 passengers were carried; so it would seem that this month the traffic is to be still greater.

Handley Page Transport are now working their machines on the intensive plan, making four flights per day with practically two machines in action. The old original W.8, G-EAPJ, has now been fitted with Rolls-Royce engines, and has been put on the service within the last week; while two of the three W.8 B's have been altered to accommodate 14 passengers in addition to the pilot and wireless operator—the third of these machines now being in process of alteration.

The Surrey Flying Services have now completed several machines, and are to open their joy-ride centres at Plymouth and Great Yarmouth immediately. They have increased their staff, and are working hard with the object of getting out more Avros for the opening of other joy-ride centres early this season.

### The Air Service to Berlin

THE first flight of the Daimler Airway to Berlin was an unqualified success. On the outward journey the G-EBBS, in spite of her 120,000 miles' flying, accomplished the journey in 6½ hours actual flying time; while next morning her Napier engine was started at 9 a.m., and was not stopped again until the machine arrived at Croydon at 8.30 p.m. Capt. Hinchecliffe had to fight against a strong head-wind, which at times reached a speed of 40 miles an hour, throughout the whole journey, while all over Germany—until he was well

into Holland—driving rain and low clouds added to the difficulties of the journey. In spite of this he arrived at Croydon after about ten hours in the air, and, contrary to expectations, his passengers were thoroughly pleased with the whole flight, and did not show the slightest signs of fatigue. Today (Monday) the second flight to Berlin has been made. For this, after last week's successful inauguration, there has been an overwhelming number of bookings. In fact, a Daimler Airways official told me that the machine could have been filled several times over. A telegram received by Daimlers during the week stated that the difficulties which had prevented the opening of the German services last Monday had been overcome, and that they (the Germans) would start their services as from today.

### Another Air-Mail Experiment

FOLLOWING the successful air-mail flight from Plymouth to London by the Instone Air Line, they hope to carry out a similar experiment in connecting Plymouth and Manchester on Wednesday of this week. This will make a difference of approximately 24 hours in the time of the arrival of American mails in Manchester.

A party of school-girls who had flown over from Belgium for their Easter holidays returned by air from Manchester to Brussels during the week. They travelled by the Daimler "air express" from Manchester to London, where the Instone machine for Brussels and Cologne had been held back specially to await their arrival. With but little delay they transferred to this machine, and arrived in Brussels in record time.

The regulations regarding the admission to the Customs' area have had to be tightened now that the traffic is so great, and it is almost impossible for anybody except those having actual business in connection with the arrival and departure of the aeroplanes, and the passengers themselves, to pass through into the Customs' area. This is all to the good, as at times the crowd in this area has been so great as to interfere seriously with the duties of the officials.

### Alterations to London-Paris Services

THE following alterations in the times of departure of the C.M.A. and G.E.A. Air Union machines on the London-Paris service are notified:—

London-Paris.—Dep. 32, Haymarket, 11.45 a.m. and 1.30 p.m.; dep. Croydon, 12.45 p.m. and 2.30 p.m. Arr. Le Bourget, 3.15 p.m. and 5 p.m. (British Summer time).

Paris-London.—Dep. 6, rue Auber, 11.30 and 1.30 (French

time); dep. Le Bourget, 12.30 and 2.30 (French time). Arr. Croydon, 4 p.m. and 6 p.m. (B.S.T.).

### The Aero Philatelic Club

AN ordinary meeting of the Aero Philatelic Club will be held at 89, Farringdon Street, E.C. 4, on Wednesday, May 16, when Mr. Harold L. Hayman will give a display of Aero Covers of Great Britain.

## THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN APRIL 22 AND MAY 5, INCLUSIVE

Route (including certain diverted journeys)	No. of flights*	No. of passengers	No. of flights carrying		No. of journeys completed†	Average flying time	Fastest time made by	Type and (in brackets) Number of each type flying
			Mails	Goods				
Croydon-Paris ...	65‡	148	23	44	59	2 37	H.P.W.8B G-EBBH (2h. 13m.)	B. (1), D.H. 9 (1), D.H. 34 (1), G. (13), H.P.W.8B. (4), Sp. (1).
Paris-Croydon ...	51	376	14	31	49	2 57	H.P.W.8B G-EBBI (1h. 57m.)	B. (1), D.H. 34 (1), G. (11), H.P.W.8B. (4), Sp. (1).
Croydon-Brussels-Cologne	19§	72	11	13	19	4 10	D.H. 18 G-EAWW (3h. 4m.)	D.H. 4 (1), D.H. 9 (1), D.H. 18 (1), D.H. 34 (4).
Cologne-Brussels-Croydon	20	89	12	6	20	4 56	D.H. 34 G-EBBW (3h. 22m.)	D.H. 4 (1), D.H. 9 (1), D.H. 18 (1), D.H. 34 (4).
Croydon-Rotterdam ...	15	22	13	14	15	2 25	Fokker H-NABM (1h. 55m.)	F. (5).
Rotterdam-Croydon ...	14	37	13	14	14	3 5	Fokker H-NABR (2h. 29m.)	F. (5).
Manchester-Croydon-Amsterdam	13¶	47	3	3	12	5 17	—	D.H. 9 (1), D.H. 34 (3).
Amsterdam-Croydon-Manchester	17**	35	4	3	15	—	—	D.H. 34 (3).
Total for two weeks ...	214	826	93	128	203	—	—	—

\* Not including "private" flights.

‡ Croy.-Lym. 8, Lym.-L.B. 11.

§ Croy.-Brus. 4, Brus.-Col. 1.

|| Col.-Brus. 2, Brus.-Col. 5.

¶ Man.-Croy. 4, Croy.-A'dam. 1, Croy.-Berlin 2.

\*\* Berlin-Croy. 1, A'dam.-Croy. 7, Croy.-Man. 9.

Av = Avro. B = Breguet. Br = Bristol. Bt = B.A.T.

D.H.4. = De Havilland 4, D.H.9. (etc.).

F = Fokker. Fa = Farman F.50. G = Goliath Farman. H.P. = Handley Page. M = Martinsyde. Sp = Spad.

Vi = Vickers Vimy. Vu = Vickers Vulcan. W = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Co. des Grandes Expresses Aériennes; Daimler Hire, Ltd.; Handley Page Transport, Ltd.; Instone Air Line; Koninklijke Luchtvaart Maatschappij; Messageries Aériennes.

## AN OPTICAL ALTITUDE INDICATOR FOR NIGHT LANDING

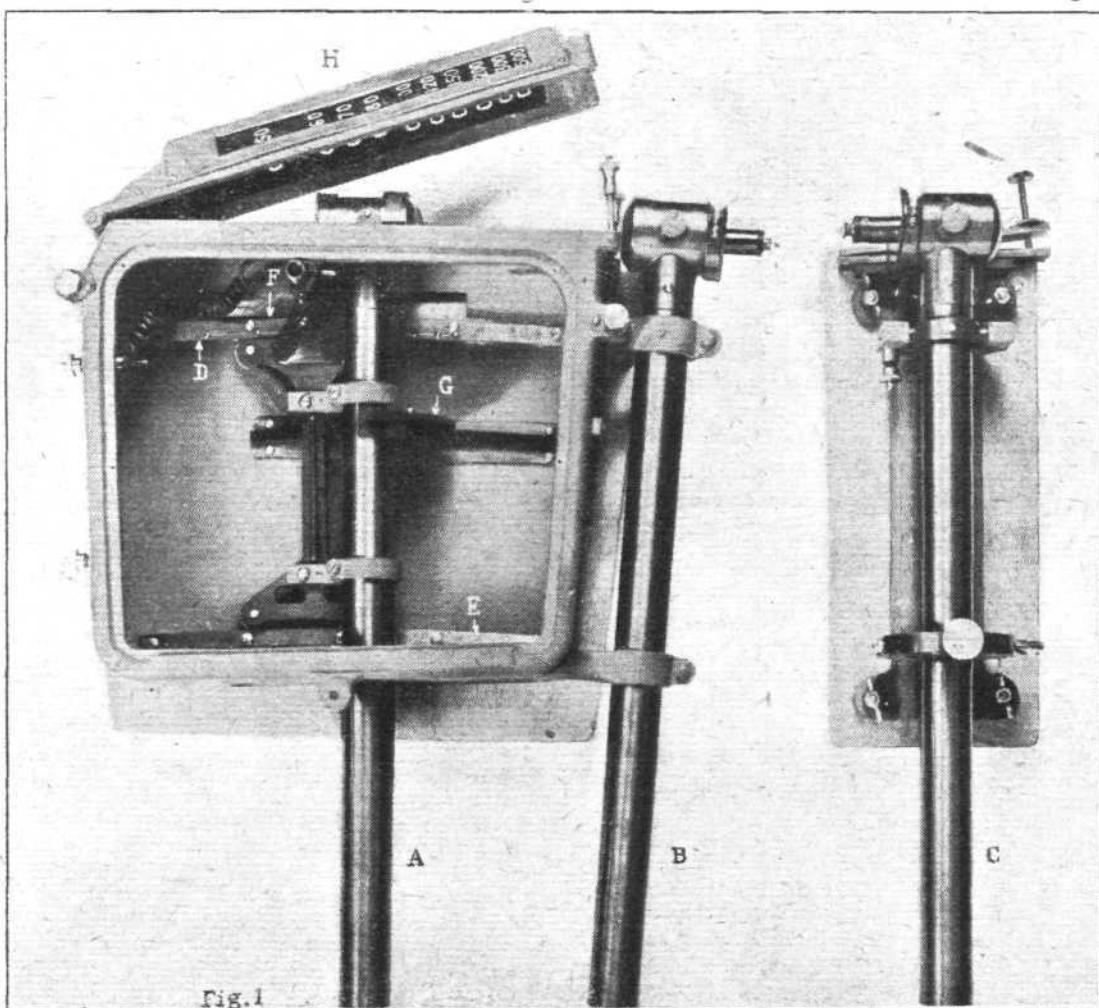
By JOHN A. C. WARNER, Bureau of Standards

THAT practical commercial aviation has come to stay must be admitted by even the most sceptical. The rapid advance which the past few years have witnessed is unmistakably the forerunner of greater activity in this comparatively new field of communication and transportation. It is at once evident, however, that the greatest benefit cannot be derived from the use of aircraft as commercial carriers unless their operation can be extended over the full 24-hr. day; for their inactivity during the hours of darkness robs them to a great extent of their advantage over the systems of ground transportation.

For this reason the problem of flying at night and under other conditions of low visibility is now demanding the attention of many aeronautical experts. We must equip our airways and aircraft with suitable means for surmounting

which provides a characteristic image on the landing surface; as shown in Figs. 2 and 3, a rectangular bar is projected by B and two blunt arrowheads by C. The ground image from A is the altitude figure representing the particular altitude for which the projector is set.

In determining the altitude of the aircraft the pilot simply turns the wheel attached to the pinion mating with rack F until the light beam from A intersects that from C at the landing surface. As A rotates, a toothed metal disc, G, attached to A, and extending through the walls of the projector tube into the light-beam, is caused to rotate in a definite manner by virtue of the action between the teeth of G and those of the fixed rack with which they engage. The rotating disc acts as a rotatable object screen, for it is pierced by openings in the form of the altitude numerals corresponding



THE JENKINS NIGHT ALTITUDE INDICATOR : Fig. 1, the complete instrument.

the obstacles offered by these adverse conditions. This, of course, involves the installation of markers and beacons to clearly define the routes and fields, and also the equipping of aircraft with suitable instruments for navigation and landing. One of the most ingenious of the devices intended for use in night landing, especially emergency landing, is a very simple optical instrument known as the Jenkins night altitude indicator.

Referring to Fig. 1, we note three projectors: A, B and C, each of which is equipped with an incandescent lamp properly mounted at the upper extremity to project a beam of light downward through the tube to the ground or water upon which a landing is to be made. Two of these projectors, B and C, are attached rigidly and parallel to each other to the side of the aircraft, while the third, A, is made rotatable (upon rails D and E) through a certain angle in a plane parallel to the fore-and-aft axis of the ship. Motion of A is brought about by the aviator, who manipulates a hand-wheel operating through a pinion mating with rack F.

Projectors B and C are each equipped with an object screen

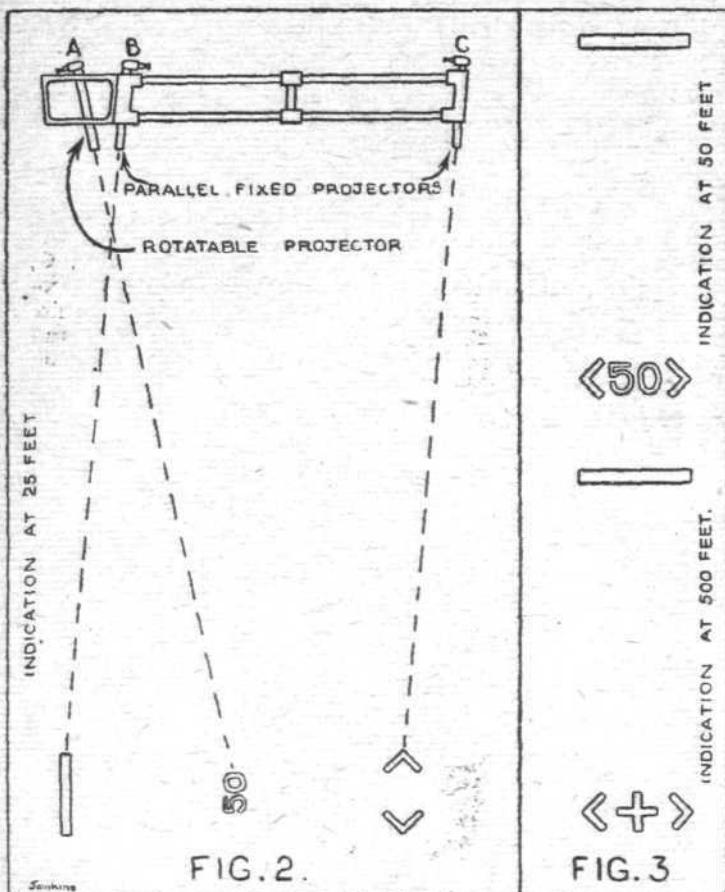
\* National Advisory Committee for Aeronautics (U.S.A.). Technical Note No. 123.

to the particular setting of the projector. Thus it is that the image seen upon the landing surface between the arrowheads projected by C is that of the altitude numerals cut in G, through which the light passes.

The altitude may also be observed on the transparent scale H, for an opening in the case containing the illuminating element of A allows a beam of light to fall upon the scale graduation which corresponds to the particular setting of the projector at which the ground images are seen to meet. The intersecting beams (from A and C) form two sides of a triangle whose altitude, determined with the instrument, is also that of the aircraft above the landing surface.

Inasmuch as 50 ft. is the lowest direct indication of altitude for the instrument described, the illuminated bar image projected by the fixed source B is employed in estimating altitudes of less than 50 ft. It will be seen that as the aircraft approaches the ground with all three projectors stationary, the numeral "50" will move from the arrowheads toward the bar image. The prevailing altitude is then estimated by observing the position of the altitude image with respect to the bar and arrowheads.

For example, an altitude of 25 ft. would be indicated when



THE JENKINS NIGHT ALTITUDE INDICATOR :  
Figs. 2 and 3, diagram of apparatus and the projected image.

the numerals were observed midway between the other two images, as shown by Fig. 2. The maximum direct indication of the instrument is 500 ft. (see Fig. 3).

The night altitude indicator described has been used in Great Britain. Tests of the instrument conducted in this country have shown satisfactory results.\*

The Germans have developed several types very similar in principle to the Jenkins device. One of the most interesting of these involves the projection of a beam downward and forward from a light-source fixed to the tail of the aircraft. Diffusely reflected rays are in turn thrown upward from the landing surface and pass through an optical arrangement in the cockpit where the pilot may observe his altitude by noting the position of a spot of light against a transparent scale.

Various possible modifications and improvements of the above instruments are readily apparent. For example, the Jenkins' indicator might be simplified by omitting the second projector (B), whose advantages are of doubtful importance; for at altitudes below 50 ft. a pilot would generally prefer to watch the landing area ahead of him rather than to observe the ground images and estimate their relative positions.

Further simplification might be effected by having both projectors (A and C) fixed to the aircraft in definite positions. In this case the beams of light would intersect at the landing surface for only the one chosen altitude to which the arrangement had been adjusted. Other altitudes might be estimated by noting the separation of the images. For such purposes it would be desirable to have the projected images characteristic of their source; otherwise difficulty would arise in readily determining whether the forward or aft image was leading.

To the writer's knowledge no tests have been conducted in this country to determine the characteristics of the German adaptations as mentioned above. However, one might reasonably doubt the feasibility under all conditions of using the diffusely reflected rays from a landing surface for other than direct observations.

\* Bureau of Standards tests conducted in flight and in the laboratory by A. H. Mears and J. B. Peterson.

## NOTICES TO AIRMEN

A REVISED list of notices operative and cancelled has been issued by the Air Ministry, from whom copies can be obtained.

### Aerodromes for Civil Use

A CONSOLIDATED list is now available from the Air Ministry corrected to April 1, 1923.  
(No. 26 of 1923.)

### Italy : Ratification of International Air Convention

1. THE Italian Government having deposited its ratification of the International Air Convention on March 13, 1923, the provisions of the Convention will come into force in Italy, in respect of the States which have already ratified, on April 23, 1923.

2. A Notice to Airmen describing the present facilities for civil aviation, prohibited areas, etc., in Italy will be issued when more complete information is available.  
(No. 28 of 1923.)

### Holland : Emergency Landing Grounds

EMERGENCY landing grounds in Holland are now available :—

(i) *Wissekerke*.—Lat.  $51^{\circ} 34' N.$ , Long.  $3^{\circ} 45' E.$  Situated on North Beveland island, in the Geersdijk Polder, 2 kms. S. of Wissekerke village.

(ii) *Roosendaal*.—Lat.  $51^{\circ} 32' N.$ , Long.  $4^{\circ} 30' E.$

Situated  $3\frac{1}{2}$  kms. E.N.E. of Roosendaal, on the south side of the road to Breda.

For full details application for No. 29 should be made to the Air Ministry.  
(No. 29 of 1923.)

### Spain : Customs Aerodromes

1. VITTORIA and Pamplona have been declared customs aerodromes in place of Lasarte (San Sebastian).

2. Particulars of the facilities available at Vittoria were published in Notice to Airmen No. 85 of 1921.

There is a landing ground at Pamplona to the north of the town. No information is available as to the facilities existing at this place, nor as to any additional facilities provided at Vittoria.

(No. 30 of 1923.)

### France : Registers of Airmen's Requests

THE French Government have provided at every aerodrome under the control of the Service de la Navigation Aérienne a "Register of Airmen's Requests," in which pilots are invited to set down such requests and observations as they may desire to bring to the notice of the authorities. These books will be forwarded each month to the office of the S.N.A., and will be returned during the following month with remarks, showing the steps taken in regard to the matters raised.

(No. 32 of 1923.)

### Married

MARK ADAMSON HARKER, Flight Lieut., R.A.F., second son of Mr. and Mrs. Harker, of Boswall-on-Dee, was married on April 28 at St. Peter's, Belsize Park, to EDITH FRANCES, daughter of Dr. JOHN and Mrs. IVIMEY, 7, Lancaster Road, Belsize Park, London, N.W.

Flying Officer ULRIC CAMPBELL DE BURGH, R.A.F., late R.N. (retd.), younger son of the late Hugo de Burgh, of Ballinapierce, and Mrs. Gerald Dunne, of Black Hall, Sallins, Co. Kildare, Ireland, was married on April 30, at the Church of St. John the Evangelist, Princes Street, Edinburgh, to KATHLEEN, younger daughter of Mr. and Mrs. GEORGE USHER, of 16, Grosvenor Crescent, Edinburgh.

### To be Married

The engagement is announced between ALGERNON, youngest son of the late AUBREY CARTWRIGHT, of Edgcote, Northants, and ROSE, youngest daughter of GEOFFREY F. BUXTON, C.B., Hoveton Hall, Norwich.

The marriage will take place on Tuesday, June 12, at St. Margaret's, Westminster, of Maj. EWART DOUGLAS HORSFALL, M.C., late R.A.F., only surviving son of Mr. Howard Douglas Horsfall, of Mere Bank, Liverpool, with Miss MYRA DOWNING FULLERTON, of Court House, Kineton, Warwickshire, younger daughter of the late Mr. and Mrs. Frederick Downing Fullerton. A reception will be held after the ceremony at Claridge's Hotel.



London Gazette, May 1, 1923

Air Commodore F. C. Halahan, C.M.G., D.S.O., M.V.O., relinquishes the appointment of Director of Aeronautical Inspection, Air Ministry; April 1.

## Promotions

The follg. promotions are made:—

## General Duties Branch (Supplementary List)

Flight-Lieut. to be Squadron-Leader.—R. Hutton; Jan. 1.

## Stores Branch (Supplementary List)

Flight-Lieut. to be Squadron-Leader.—J. C. E. Gillham; Jan. 1.

Flying Officers to be Flight-Lieuts.—F. R. Berresford, A. J. Roberts, T. S. James, W. A. O. Honey; Jan. 1. A. E. M. Dredge, M.B.E., F. S. Moore; Jan. 27.

## General Duties Branch

The follg. are granted short service commns. as Flying Offrs. for five years on the active list, with effect from, and with seny. of, the dates indicated:—F. E. W. Davis; April 18. G. W. Higgs; April 16. A. A. N. D. Pentland, M.C., D.F.C.; April 23.

The follg. promotions are made:—

Flying Officer to be Hon. Flight-Lieut.—J. E. Catherall, M.B.E. (Capt. R. Warwick's Regt.); Jan. 1.

Pilot Officers to be Flying Officers.—D. R. Sharman, M.C.; April 1. B. J. J. Nimmo; April 29.

Flight-Lieut. A. W. Symington, M.C., remains on half-pay, Scale A, for a further period of three months; April 1. The follg. are placed on half-pay, Scale B:—Flight-Lieut. H. H. Balfour, M.C.; April 25. Observer Offr. J. Bowen; April 19.

## ROYAL AIR FORCE INTELLIGENCE

## Appointments.—The following appointments in the R.A.F. are notified:—

## General Duties Branch

Group Captain: A. Fletcher, C.M.G., C.B.E., M.C., to R.A.F. Depot. 18.3.23. (Non-effective pool.) On transfer to Home Establishment.

Wing Commander: I. T. Courtney, C.B.E., to Half-pay List. 4.4.23. J. H. S. Tyssen, M.C., to No. 5 Wing Headquarters, Biggin Hill. 30.4.23, to command.

Squadron-Leaders: C. G. Tucker, to R.A.F. Depot. 9.2.23. (Non-effective pool.) W. A. McClaughry, D.S.O., M.C., D.F.C., to Headquarters, Inland Area, Uxbridge. 23.4.23. Sir C. J. Q. Brand, K.B.E., D.S.O., M.C., D.F.C., to No. 5 Wing Headquarters, Biggin Hill. 20.4.23. W. R. Read, M.C., D.F.C., A.F.C., to No. 1 School of Technical Training (Boys), Halton. 1.5.23.

Flight-Lieutenants: T. E. B. Howe, A.F.C., to No. 32 Squadron, Kenley. 1.5.23. E. O'D. Crean, to Aircraft Depot, Iraq. 11.4.23. F. L. Luxmoore, to No. 1 Squadron, Iraq. 26.3.23. W. A. K. Dalzell, to No. 45 Squadron, Iraq. 30.3.23. G. A. H. Pidcock to Headquarters, Iraq Command. 23.3.23. F. R. Wynne, M.B.E., to Headquarters, Iraq Command. 21.3.23. C. P. O. Bartlett, D.S.C., to R.A.F. Depot. 18.4.23. G. T. Richardson. The posting of this officer to the School of Photography, South Farnborough, as previously notified, is hereby cancelled. G. Bowen and H. M. Massey, M.C., both to R.A.F. Depot. 18.3.23. (Non-effective pool.) On transfer to Home Establishment. C. B. S. Spackman, D.F.C., and H. B. Pett, M.O., to R.A.F. Depot. 18.3.23. On transfer to Home Establishment. C. R. Steele, D.F.C., and E. I. Bussell, to R.A.F. Depot. 26.3.23. On transfer to Home Establishment. W. D. Budgen, O.B.E., to Record Office, Ruislip. 23.4.23. J. H. Green, to Air Ministry. 23.4.23. A. S. Maskell to Air Ministry. 14.5.23. V. Buxton, O.B.E., to No. 1 Flying Training School, Netheravon. 14.5.23, for course of instruction. D. Craik, D.F.C., to No. 5 Flying Training School, Shotwick. 1.5.23.

Flying Officers: O. E. Carter and J. B. V. Glyde, to Aircraft Depot, India. 11.4.23. H. A. Anson, to No. 55 Squadron, Iraq, instead of to No. 84 Squadron, as previously notified. 23.2.23. J. B. L. H. Cordes, G. W. Higgs and E. A. Sullock, A.F.C., to R.A.F. Depot. 16.4.23. J. L. M. de C. Hughes-Chamberlain, to R.A.F. Depot. 23.4.23. G. M. Knocker, to R.A.F. Cadet College, Cranwell. 18.4.23. W. H. Poole, A.F.C., M.M., to R.A.F. Cadet College, Cranwell. 19.4.23. C. J. Poole, to R.A.F. Depot. 15.5.23. S. H. Reynolds, to H.M.S. "Hermes." 1.5.23. W. J. Cooke, to No. 100 Squadron, Spittlegate. 23.4.23. H. W. Iles, to No. 100 Squadron, Spittlegate. 22.3.23. H. S. R. Burt, to No. 39 Squadron, Spittlegate. 23.4.23. F. E. W. Davis, to R.A.F. Depot. 18.4.23. G. R. O'Sullivan, to No. 6 Squadron, Iraq. 27.3.23. H. W. Clayton, to No. 100 Squadron, Spittlegate. 7.5.23. E. H. Oxley-Boyle, to R.A.F. Cadet College, Cranwell. 24.4.23. W. J. Rivett-Carnac, to School of Technical Training, Men, Manston. 24.4.23. W. Anderson, to Aircraft Depot, Iraq. 27.3.23. A. H. Baker, to Inland Area Aircraft Depot, Henlow. 24.4.23. J. W. Bell, D.S.M., to No. 1 School of Technical Training (Boys), Halton. 15.5.23. R. de H. Hutchinson, to No. 100 Squadron, Spittlegate. 24.4.23. M. G. Penny, to No. 30 Squadron, Iraq. 16.3.23. D. H. Geeson, to No. 45 Squadron, Iraq. 17.3.23. R. C. Bryant, to Headquarters Iraq Command. 20.4.23. C. Findlay, D.F.C., to No. 7 Group, Headquarters, Andover. 23.4.23. P. Harris, to H.M.S. *Pegasus*. 23.3.23. A. J. Rankin, to No. 267 Squadron, Mediterranean. 7.4.23. G. L. Carter, H. J. Young, M.B.E., J. E. H. Littlewood, and C. R. L. Shaw, all to R.A.F. Depot. 18.3.23. On transfer to Home Establishment. C. D. Spiers and F. R. Offord, to



## Casale's Altitude Record Beaten

On May 3, the altitude record of 7,336 metres with a useful load of 250 kgs., which was held by Casale on a Spad-Herbemont fitted with a French-built Bristol "Jupiter," was beaten by Adjutant Gontard, who, piloting a Breguet type 14 A2 fitted with 300 h.p. Renault engine and a Rateau supercharger, is stated to have reached a height of 8,000 metres (26,300 ft.). It is significant, however, that the French engine required a supercharger to enable it to beat the record established with the "Jupiter" without this accessory.

## Low Power Flying

We would remind our readers that it is tomorrow (Friday) evening that Squadron Leader Maurice Wright will read a paper on "Low Power Flying." The paper, which is certain to be uncommonly interesting in view of the

The follg. are transferred to the Reserve:—

Class B.—Observer Offr. A. W. C. Bayes; Jan. 1 (substituted for *Gazette* Dec. 1, 1922).

Class C.—Flying Offr. H. J. Mitchell; May 4. Pilot Offr. J. E. S. Caithness resigns his permanent commn.; May 2.

## Stores Branch

H. G. Bushell is granted permanent commn. as Flying Offr. for accountant duties; Jan. 15, 1921 (since promoted). (*Gazette* Feb. 4, 1921, appointing him to short service commn. is cancelled.) Flying Offr. N. E. D. Hutchinson is confirmed in rank; April 13.

## Reserve of Air Force Officers

Class A.—The follg. are granted commns. on probn. in the Gen. Duties Branch in the ranks stated (May 1):—

Flying Officers.—A. R. Boeree, W. E. Cowan, P. R. Dawson, E. C. Dickens, F. Ellam, H. J. Ellam, D. L. Forestier-Walker, A. E. Francis, E. O. Fuller, H. Haycock, B. A. Hewett, J. E. A. Hoare, R. Jarman, A. S. Keep, G. W. Lavington, J. McCosh, A. F. Marlowe, L. Reynolds, G. H. Rogers, F. A. Smith, R. M. Smith, R. R. H. Taylor, B. A. Trechmann, P. Wilson, C. E. Young.

Pilot Officers.—D. M. David, H. B. Elwell, E. A. Kemp, F. J. Letzer, D. G. R. Lord, L. Motley, K. Onyett, F. E. Watts, J. E. Whitehead, D. L. H. Williams, C. Wilson.

Miss E. A. Plewman resigns her appointment as Sister; April 30.

## Memorandum

Flying Offr. (Hon. Flight-Lieut.) G. M. Cox relinquishes his temp. commn. on ceasing to be empld. with No. 1 Works Coy.; Nov. 13, 1922.

## Nursing Service

R.A.F. Depot. 18.3.23. (Non-effective pool.) On transfer to Home Establishment. O. D. Freeman, to R.A.F. Depot. 26.3.23. (Non-effective pool.) On transfer to Home Establishment. W. J. Richards, to R.A.F. Depot. 26.3.23. On transfer to Home Establishment. W. R. F. Clover and S. McD. Watson, to R.A.F. Depot. 6.4.23. On transfer to Home Establishment. R. B. Sutherland, D.F.C., to Inland Area Aircraft Depot, Henlow. 26.4.23. J. Bowen, to Half-Pay List. 19.4.23. W. D. Vernon-Knibbs, to School of Army Co-operation, Old Sarum. 1.5.23. H. A. Argles, to R.A.F. Base, Gosport. 1.5.23. G. A. Hadley, to No. 39 Squadron, Spittlegate. 15.5.23. E. J. Protheroe, to R.A.F. Base, Gosport. 7.5.23. J. G. Murray, to R.A.F. Depot. 28.4.23.

Pilot Officers: R. C. Harrison, to No. 84 Squadron, Iraq, instead of to No. 55 Squadron as previously notified. 23.2.23. J. J. Comerford, C. B. Horsfield, C. B. Greet, G. W. Dean, B. V. Reynolds, and T. A. Verney-Cave, all to R.A.F. Depot. 16.4.23, pending disposal. J. V. Holman, to No. 2 Squadron, South Farnborough. 1.5.23.

## Stores and Accountants Branch

Squadron Leader: W. J. Waddington, O.B.E. (Stores), to R.A.F. Depot 6.4.23. On transfer to Home Establishment.

Squadron Leader: J. L. Robertson (Accountant), to No. 1 Stores Depot, Kidbrooke. 27.4.23.

Flight-Lieutenants: P. A. Simmons (Accountant), to R.A.F. Base, Calshot. 18.4.23. L. Smith (Stores), to No. 1 Flying Training School, Netheravon. 18.4.23. W. C. Green, M.C. (Stores), to R.A.F. Depot. 6.4.23. On transfer to Home Establishment.

Flying Officers (Stores): H. N. Stevens, to Aircraft Park, India. 11.4.23. H. T. H. Copeland, to R.A.F. Depot. 23.3.23. D. Barron, to C and M Party, Biggin Hill. 7.5.23. F. D. D. Gaußen, to R.A.F. Depot. 18.3.23. On transfer to Home Establishment. C. H. Masters, to R.A.F. Depot. 26.3.23. (Non-effective pool.) On transfer to Home Establishment. V. S. Holbrook, to R.A.F. Depot. 1.5.23. (Non-effective pool.) J. G. Smithson, to R.A.F. Base, Gosport. 15.5.23.

Flying Officers (Accountants): A. C. Pritchard, to No. 84 Squadron, Iraq. 21.3.23. N. E. D. Hutchinson, to No. 32 Squadron, Kenley. 7.5.23. J. J. T. Rose, to School of Balloon Training, Larkhill. 15.5.23.

## Medical Branch

Squadron Leader: A. J. Brown, D.S.O., to No. 1 School of Technical Training (Boys), Halton. 30.4.23.

Flight-Lieutenants: J. G. Skeet, to R.A.F. Depot. 24.4.23. T. L. P. Harries, M.B., to No. 5 Flying Training School, Shotwick. 20.4.23. J. K. R. Landells, M.B., B.A., to No. 1 School of Technical Training (Boys), Halton. 19.4.23. J. H. W. Fitzgerald (Dental), to No. 3 Group Headquarters, Spittlegate. 4.4.23. C. A. Meaden, to R.A.F. Base, Leuchars. 26.4.23. E. G. S. Hall, M.B., to R.A.F. Base, Calshot. 4.5.23.

## Royal Air Force Sports Board

## Arrangements for May, 1923

Wednesday, 2nd.—Association. Final inter-unit competitions, Uxbridge (3 p.m.).

Thursday, 10th, and Friday, 11th.—Boxing. I.S.B.A. Championships, Aldershot.



popularity which this new form of sporting flying will undoubtedly attain, will be illustrated by lantern slides, and it is gathered that a film will be shown of the first flying trials of the "Wren," designed by Mr. W. O. Manning, built by the English Electric Company, and piloted by Major Wright. The lecture begins at 6.30 p.m., and non-members are admitted without invitation card. As usual, the meeting will take place at the Engineers' Club, Coventry Street.

## Projected Transatlantic Air Line

THREE aeroplanes belonging to the Lignes Aériennes Latécoères left Casablanca for Dakar, a distance of 1,600 miles, at dawn on May 3. They reached Agadir during the day, and were due at Dakar the following night. This flight is undertaken with a view to the ultimate opening of a regular mail service between France and South America.

**SOCIETY OF MODEL AERONAUTICAL ENGINEERS**

(London Aero Models Association)

THE Competition Secretary desires to draw attention to the fact that he must receive all entries for competitions by 8.30 p.m. on the Friday preceding the event. On Friday next, May 11, Mr. D. A. Pavely will give a lecture on "Compressed-Air Plants" at Headquarters at 7.30 p.m.

Saturday, May 12, is fixed for a meeting to improve general records, at Hackney Marshes at 2.30 p.m.

Friday, May 18, Mr. C. J. Burchell will give a demonstration on the construction of double-surfaced 'planes.

Sunday, May 20, the third round for the "D. H. Pilcher" Challenge Cup will be held on Parliament Hill Fields.

Whit Monday, May 21, is the date fixed for the "Gamage" Challenge Cup Competition, to be held on Wimbledon Common at 2 p.m. It is understood that representatives of Model Aeronautical Societies on the Continent will be present to compete in this important event.

A. E. JONES, Hon. Sec.

**PADDINGTON AND DISTRICTS AERO CLUB**  
 (Affiliated to the Society of Model Aeronautical Engineers)

MEMBERS held an enjoyable meeting at Sudbury Hill last Saturday. Messrs. F. de P. Green and M. Levy were out with their spar monoplane gliders, the former's best glider being 36½ secs. and Mr. Levy's 36 secs. Both models are likely to improve on these durations next time. Mr. H. S. Woolley timed the glides, whilst Mr. W. E. Evans took snapshots. Mr. C. Burchell, of the S.M.A.E., flew a small spar tractor monoplane which attained a high ceiling several times and eventually perched on the top of a tall tree, and hope of recovering it was given up. Moral: Don't launch your flying models near trees when there is a large open space available. A friendly gliding match between Mr. Burchell and Mr. Levy resulted in an easy win for Mr. Burchell, whose best glide was 41 secs.

The Competition for the Paddington Cup will be held at Sudbury Hill on Saturday, September 8. The competition is an open one, and further particulars with rules will be published at an early date.

M. LEVY, Hon. Sec.

**POWER PLANTS FOR MODEL AEROPLANES**

By A. F. Houlberg

(Continued from page 219)

**Steam Motors**

THE same considerations govern the general design of steam engines as the design of compressed air engines, and it is therefore unnecessary to repeat them here. The only differences are detail ones, such as the necessity of brazing or silver-soldering all joints, the use of proper piston rings instead of the leather washers commonly used for compressed air motors, and the provision of adequate lubrication. The only type of boiler we need consider for aeroplane use is the flash type, since it is far and away the lightest for a given steaming capacity. The flash boiler consists of a suitable length of steel tubing, approximately  $\frac{1}{4}$  in. O.D., coiled to a suitable diameter within an outer casing of thin sheet iron lined with asbestos, and is fired by means of a blow lamp. Water is fed into one end of the coil by pressure pump, through a non-return valve, where it is immediately flashed into steam and delivered to the engine from the other end under considerable pressure and high temperature. The working temperature is so high that adequate lubrication presents some difficulty, and it would appear advisable to provide for forced feed lubrication by plunger pump to the more important bearing surfaces. The parts which present the greatest difficulty are the water-feed pump and the non-return valve, both of which must be reliable and regular in their functioning, for the reason that if too much water is fed to the boiler coil it will not get flashed into steam, but will simply flood the engine and boiler. On the other hand, if the water feed is inadequate the engine will not speed-up and will be erratic in its running. The only type of water pump which can effectively deal with the pressures generated is the plunger type, and it can be easily arranged for the non-return valve to form a unit with it.

The ball type non-return valve is the one which, up to the present, has been the most successful, and consists of two ball valves in the water passage; one opening the passage to the water supply on the suction stroke of the pump, but preventing the return of the water on the pressure stroke, and the other opening the passage to the boiler coil on the pressure stroke of the pump, but closing immediately the pressure in the coil exceeds the pressure of the pump. To make sure of the delivery valve doing its work properly it is of advantage to

fit a further ball valve between it and the boiler coil to act as a check valve and steady the supply of water.

Ball valves are, however, somewhat erratic in their behaviour, since the slightest trace of foreign matter upsets them, and I think experiments on the ported rotary plunger type would lead to more consistent results and amply repay the time spent on them, particularly as they can have the additional advantage of an adjustable delivery with a constant stroke.

A two-cylinder engine of  $\frac{1}{2}$ -in. bore by  $\frac{1}{2}$ -in. stroke is quite large enough for model aeroplane work, and the smaller the plant can be made the better, so long as its efficiency is not impaired thereby.

(To be continued.)


**PUBLICATIONS RECEIVED**

*Year-Book of Wireless Telegraphy and Telephony*, 1923. London: The Wireless Press, Ltd., 12-13, Henrietta Street, Covent Garden, W.C. 2.

*Militärwissenschaftliche und Technische Mitteilungen (Fortsetzung der M.A.u.G.)*, March-April, 1923. Vienna: Schriftleitung und Verlag Wien, Getreidemarkt 9.

*Moedebecks Taschenbuch für Flugtechniker und Luftschiffer*. Verlag M. Krayn, Genthiner Strasse 39, Berlin, W. 10. Price 15s. 6d.

*Aeronautical Research Committee, Reports and Memoranda*, No. 753 (Ae. 17). An Investigation of the Wind Forces and Moments acting on Models of the Caquot Kite Balloon. By L. F. G. Simmons and H. Bateman. June, 1920. Price 1s. 3d. net; by post 1s. 4d. No. 816 (Ae. 67). A Comparison between the Aerodynamic Properties of Two Aerofoils of the Same Section, but with Square and Rounded Wing Tips Respectively. By W. L. Cowley and C. N. H. Lock. August, 1921. Price 6d. net; by post 6½d. No. 817 (Ae. 68). Wing Tunnel Tests on a Fokker Biplane. By W. L. Cowley. September, 1921. Price 3d. net; by post 3½d. London: H.M. Stationery Office, Kingsway, W.C. 2.

**Catalogue**

*Pig Irons*. British Pigirons, Ltd., Abbey House, 2, 4, 6 and 8, Victoria Street, Westminster, S.W. 1.


**AERONAUTICAL PATENT SPECIFICATIONS**

*Abbreviations*: cyl. = cylinder; I.C. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

**APPLIED FOR IN 1922**

Published May 10, 1923

 787. G. T. MACFARLANE. Man-power flying. (196,043.)  
 4,059. J. R. PORTER. Aeronautical machines. (196,131.)

**SECRET PATENTS RE-ASSIGNED TO THE INVENTOR**
**APPLIED FOR IN 1918**

Published May 10, 1923

8,118. A. M. LOW. Apparatus for launching aerial projectiles, etc. (195,991.)

**NOTICE TO ADVERTISERS**

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

**FLIGHT**
*The Aircraft Engineer and Airships*

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address: Truditur, Westcent, London.

Telephone: Gerrard 1828.

**SUBSCRIPTION RATES**

"FLIGHT" will be forwarded, post free, at the following rates:—

**UNITED KINGDOM**
**ABROAD\***

	s. d.		s. d.
3 Months, Post Free...	7 7	3 Months, Post Free...	8 3
6 " " 15 2	6	" " 16 6	
12 " " 30 4	12	" " 33 0	

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates.

\* European subscriptions must be remitted in British currency

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.

Should any difficulty be experienced in procuring "FLIGHT" from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.